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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/715,986

11/18/2003

Tiezhi Zhang

1512.027

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09/18/2006

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EXAMINER

TOTH, KAREN E

ART UNIT

PAPER NUMBER

3735

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/715,986

**Applicant(s)**

ZHANG ET AL.

**Examiner**

Karen E. Toth

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,12-15 and 24-27 is/are rejected.
- 7) ☒ Claim(s) 2-11 and 16-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>28 Dec. 2004</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 14-15, and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoffman'207 (US Patent Application Publication 2002/0120207).

Regarding claim 1, Hoffman'207 discloses a monitor comprising a spirometer that measures a patient's breathing to provide an air flow signal (paragraphs [0068], [0074], [0077]); a sensor measuring chest displacement caused by breathing to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]); and a calibration circuit that receives and combines both signals to generate a corrected respiration signal (paragraphs [0066], [0069], [0080]).

Regarding claim 14, Hoffman'207 further discloses a display for displaying the corrected respiration signal (element 822; paragraph [0014]).

Regarding claim 15, Hoffman'207 discloses a method of generating a corrected respiratory signal comprising monitoring a patient's breathing with a spirometer to provide an air flow signal (paragraphs [0068], [0074], [0077]); monitoring the patient's breathing with a chest displacement sensor to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]); and combining the two signals to provide a corrected respiration signal (paragraphs [0066], [0069], [0080]).

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Regarding claim 24, Hoffman'207 further discloses that the model provides a different functional relationship between chest displacement signal and lung volume during inspiration and exhalation (paragraphs [0080], [0088]-[0089]).

Regarding claim 25, Hoffman'207 further discloses that the model detects a breath-hold from the chest displacement signal and holds the corrected respiration signal constant until the breath-hold's end (paragraphs [0070]-[0071], [0078], [0120]).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Erbel'923 (US Patent Application Publication 2002/0115923) in view of Hoffman'207, and further in view of Corn'216 (US Patent 6062216).

Erbel'923 discloses a radiation therapy system comprising a monitor for monitoring a patient's breathing, and a source that delivers controlled radiation to the patient based on a respiration signal from monitored breathing (paragraphs [0012], [0015]-[0019]). Erbel'923 does not disclose monitoring breath flow with a spirometer, chest movement with a displacement sensor, and combining the signals to create a corrected respiration signal.

Hoffman'207 teaches a system for monitoring a patient's breathing comprising a spirometer monitoring a patient's breathing to provide an air flow signal (paragraphs [0068], [0074], [0077]); a chest displacement sensor monitoring the patient's breathing to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]); and combining the two signals to provide a corrected respiration signal (paragraphs [0066], [0069], [0080]), in order to obtain a more accurate representation of the breathing signal.

Corn'216 teaches a system for monitoring a patient's breathing comprising a laser sensor for monitoring chest movement during breathing (column 1, lines 63-67; column 2, lines 41-48), in order to obtain an accurate chest displacement signal.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the method of Erbel'923 and monitored the patient's breathing by monitoring breath flow with a spirometer, chest movement with a displacement sensor, and combining the signals to create a corrected respiration signal, as taught by Hoffman'207, in order to obtain a more accurate representation of the

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breathing signal, and further obtained the chest displacement signal using a laser sensor, as taught by Corn'216, in order to obtain an accurate chest displacement signal.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being obvious over Hoffman'207 in view of Corn'216.

Hoffman'207 discloses a system comprising a respiration monitor comprising a spirometer that measures a patient's breathing to provide an air flow signal (paragraphs [0068], [0074], [0077]), a sensor measuring chest displacement caused by breathing to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]), and a calibration circuit that receives and combines both signals to generate a corrected respiration signal (paragraphs [0066], [0069], [0080]); and an imager receiving the corrected signal and acquiring component image signals from a patient over different phases of respiration and mathematically combining the component image signals according to phases of respiration when the component image signals were acquired to produce a composite image (paragraph [0108]). Hoffman'207 does not disclose the sensor being a laser displacement sensor.

Corn'216 teaches a system for monitoring a patient's breathing comprising a laser sensor for monitoring chest movement during breathing (column 1, lines 63-67; column 2, lines 41-48), in order to obtain an accurate chest displacement signal. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the system of Hoffman'207 and used a laser displacement sensor

to monitor chest displacement, as taught by Corn'216, in order to obtain an accurate chest displacement signal.

6. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erbel'923 in view of Hoffman'207.

Regarding claim 26, Erbel'923 discloses a method of radiation therapy comprising monitoring a patient's breathing and controlling radiation delivered to the patient based on the monitored breathing (paragraphs [0012], [0015]-[0019]). Erbel'923 does not disclose monitoring breath flow with a spirometer, chest movement with a displacement sensor, and combining the signals to create a corrected respiration signal.

Hoffman'207 discloses a method of monitoring a patient's breathing comprising monitoring a patient's breathing with a spirometer to provide an air flow signal (paragraphs [0068], [0074], [0077]); monitoring the patient's breathing with a chest displacement sensor to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]); and combining the two signals to provide a corrected respiration signal (paragraphs [0066], [0069], [0080]), in order to obtain a more accurate representation of the breathing signal.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the method of Erbel'923 and monitored the patient's breathing by monitoring breath flow with a spirometer, chest movement with a displacement sensor, and combining the signals to create a corrected respiration signal,

as taught by Hoffman'207, in order to obtain a more accurate representation of the breathing signal.

Regarding claim 27, Erbel'923 discloses a method of medical imaging comprising monitoring a patient's breathing, acquiring component image signals from a patient over different phases of respiration, and mathematically combining the image signals according to phases of respiration when the component image signals were acquired to produce a composite image (paragraphs [0012], [0015]-[0019], [0048]-[0050], [0053]). Erbel'923 does not disclose monitoring breath flow with a spirometer, chest movement with a displacement sensor, and combining the signals to create a corrected respiration signal.

Hoffman'207 discloses a method of monitoring a patient's breathing comprising monitoring a patient's breathing with a spirometer to provide an air flow signal (paragraphs [0068], [0074], [0077]); monitoring the patient's breathing with a chest displacement sensor to provide a chest displacement signal (paragraphs [0070]-[0071], [0078]); and combining the two signals to provide a corrected respiration signal (paragraphs [0066], [0069], [0080]), in order to obtain a more accurate representation of the breathing signal.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the method of Erbel'923 and monitored the patient's breathing by monitoring breath flow with a spirometer, chest movement with a displacement sensor, and combining the signals to create a corrected respiration signal,



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as taught by Hoffman'207, in order to obtain a more accurate representation of the breathing signal.

***Allowable Subject Matter***

7. Claims 2-11 and 16-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record fails to anticipate or make obvious the structure of claims 2-4, including, *inter-alia*, using lung volume and chest displacement signals to correct an integration offset of the lung volume signal to produce a corrected respiration signal based on the chest displacement signal.

The prior art of record fails to anticipate or make obvious the structure of claims 5-11, including, *inter-alia*, a model of the relationship between lung volume and chest displacement in a calibration circuit that receives the chest displacement signal to provide a lung volume signal as the corrected respiration signal.

The prior art of record fails to anticipate or make obvious the method of claims 16-18, including, *inter-alia*, using chest displacement signals to correct an integration offset of the lung volume signal to produce a corrected respiration signal based on the chest displacement signal.

The prior art of record fails to anticipate or make obvious the method of claims 19-23, including, *inter-alia*, applying the lung volume signal to a model of the

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relationship between the lung volume and chest displacement signals to provide a lung volume signal as the corrected respiration signal.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 5067494 to Rienmuller, which discloses a similar system and method of respiratory monitoring.

US Patent 6597939 to Lampotang, which discloses a similar system and method of respiratory monitoring.

US Patent Application Publication 2004/0082853 to Sasaki, which discloses a similar system and method of respiratory monitoring.

US Patent 6015388 to Sackner, which discloses a similar system and method of respiratory monitoring.

US Patent 6423013 to Bakker, which discloses a similar system and method of respiratory monitoring.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karen E. Toth whose telephone number is 571-272-6824. The examiner can normally be reached on Monday through Friday.

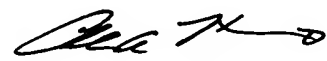
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Marmor, II can be reached on 571-272-4730. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
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Charles A. Marmor, II  
SPE, Art Unit 3735